

COMPARING EFFECTIVE AND DETAILED MODELING APPROACHES FOR PREDICTING ROOT WATER UPTAKE AT FIELD SCALE

Couvreur Valentin^{*} and Mathieu Javaux^{*†}

^{*} Department of Environmental Sciences, Université catholique de Louvain (UCL)
Croix du Sud 2, BP 2, B-1348 Louvain-la-Neuve, Belgium
web page: <http://www.uclouvain.be>

[†] Agrosphere Institute, ICG-IV, Forschungszentrum Juelich GmbH (FZJ)
Forschungszentrum Juelich D-52425, Germany
web page: <http://www.fz-juelich.de>

Summary. Despite their lack of physical bases, most effective 1-D approaches for modeling root water uptake perform relatively well when calibrated on a short period. On the other hand, detailed 3-D models with bio-physical meaning may suffer of over-parameterization and their predictive capabilities are not yet proven. In this study we used field monitoring of the water content distribution of a Maize field to test the performance of two models. The first one, called RSWMS, is a fully coupled deterministic three-dimensional model. The second one (HYDRUS-1D) is a one-dimensional model, solving the Richards equation with a compensation and a stress factor for the sink term. The two models were calibrated on a dry period when uptake is controlling the evolution of the water content distribution. Then, their calibrated parameters were used to extrapolate on a wetter period. Limitation and advantage of both approaches are shown and discussed.